

# **Middle East Safe Energy Liquid Flow Energy Storage Battery**





## Overview

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Which energy storage solutions will be the leading energy storage solution in MENA?

Electrochemical storage (batteries) will be the leading energy storage solution in MENA in the short to medium terms, led by sodium-sulfur (NaS) and lithium-ion (Li-Ion) batteries.

What is energy storage system deployment in MENA?

Energy Storage System deployment in MENA Energy Storage Systems (ESS) play a critical role in the integration of VRE into the power grid, as these systems manage the intermittencies of renewable energy resources and mitigate potential power supply disruptions.

What is an energy storage system?

An energy storage system is charged from the grid or by on-site generation to be used at a later time to take advantage of price differentials. Energy storage is used instead of upgrading the transmission network infrastructure. The storage system provides the grid with the necessary output to ensure the voltage level on the network remains steady.

Are flow batteries better than Li-ion batteries?

A pilot Vanadium Flow battery of 0.13 MW/0.50 MWh has been implemented at the Nour plant, in Ouarzazate, Morocco. Flow batteries have significantly lower efficiencies than Li-Ion batteries but provide longer storage durations, lower degradation, and lower safety concerns.

How ESS can help reduce electricity curtailment?

ESS can play a central role in reducing curtailment by ensuring that the generated electricity is stored for when it is needed, while providing flexible ramp-up. ESS can also provide capacity firming, energy arbitrage, frequency regulation, among other ancillary services<sup>6</sup>.



How do Mena utilities deal with the SBM inefficiency?

To rectify the inefficiencies of the SBM, many MENA utilities have considered privatization or public-private participation through unbundling electricity utilities into distinct generation and distribution companies, while maintaining the transmission network as a separate utility managed by a Transmission System Operator (TSO).



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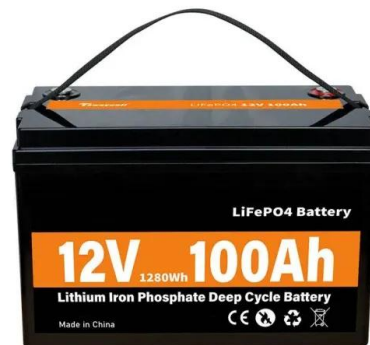
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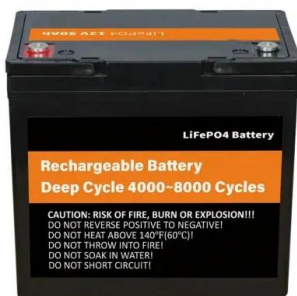
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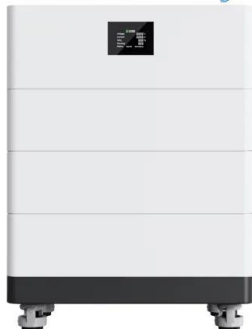
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